AMSAT

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Contents

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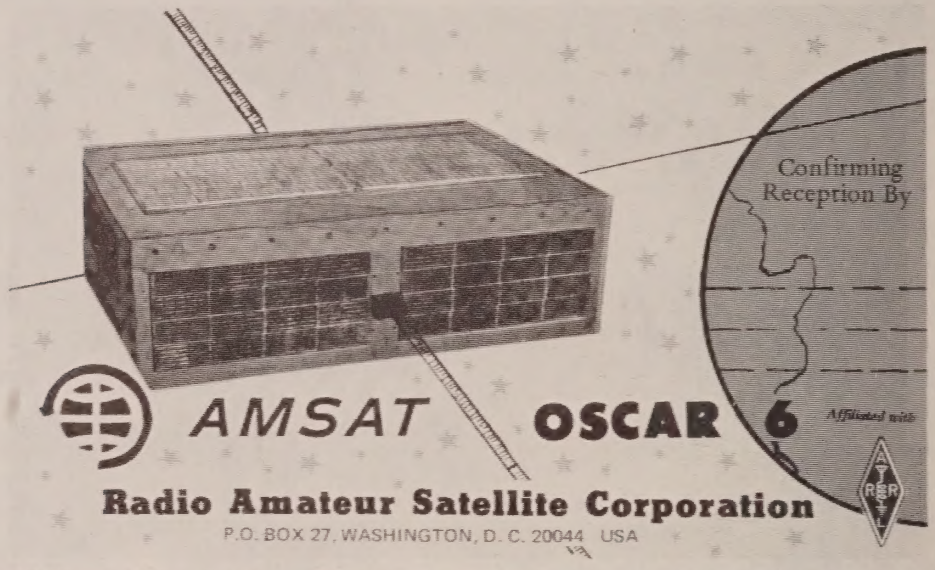
EDITORIAL -- FIRST RETURNS FROM THE IDEA SEARCH

Our "letters" column in this issue is a long one, thanks to a combination of the successful OSCAR-6 launch and a heavy response to our request for ideas. Most of the responses which we received have been printed, though in abbreviated form in some cases. Some of the ideas expressed are controversial; however, they are offered here without comment. Evaluation of suggestions is the responsibility of the Board of Directors and the Amateur Satellite Service Committee.

It is a pleasure for us to note that one idea has already been discussed by the Board of Directors and received favorable comment and encouragement: The idea by Joe Kasser to put a repeater on a balloon is described elsewhere in this issue. We hope that enough interest can be generated in this idea to translate it into a piece of hardware.

We continue to look for more ideas, and hope that the proposals given in this issue will "key" some of our readers into "add-on" ideas or fresh approaches to making satellites a more important part of amateur radio.

Bob Clark
WB4SMH



The OSCAR 6 QSL card. Have you received yours yet? Send your OSCAR 6 report to AMSAT Telemetry Dept., P.O. Box 27, Washington, D.C. 20044, USA.

AMSAT NETS

In order to keep everyone up to date on activities, AMSAT holds three regular nets. A net serving principally the eastern portion of the US meets on 3855 kHz every Monday at 2400Z (7:00 p.m. EST). A second net meets on 14,280 kHz on every Sunday at 1800Z. Also on Sundays at 1900Z, a third net meets on 21,280 kHz.

FROM THE PRESIDENT'S DESK:

AMSAT 1972 ANNUAL REPORT

By Perry Klein, K3JTE

AMSAT, the Radio Amateur Satellite Corporation, is a nonprofit organization founded in 1969 to develop amateur satellites and satellite experiments for the amateur service. AMSAT's activities are conducted primarily through its members, under the guidance and coordination of an elected seven-member Board of Directors, and officers elected by the Board. Membership is international, and there are currently over 640 members and 52 member societies in 36 countries, representing a growth in membership of fifty percent in the last year.

Accomplishments For The Year 1972

In January, the AMSAT Board of Directors approved the construction of a new amateur communications satellite on a "crash" basis, to be ready in time for a launch with the ITOS-D meteorological satellite in the latter part of 1972. This satellite, AMSAT-OSCAR-C (A-O-C) was to be based on the use of the W5CAY Morse code telemetry and CODESTORE message storage systems, the WIA-Project Australis command system, and the AMSAT two-to-ten meter linear repeater, all of which had been constructed for the more complex AMSAT-OSCAR-B (A-O-B) multiple repeater satellite. The decision to develop A-O-C provided more time to complete and test the additional systems planned for A-O-B.

AMSAT-OSCAR-C is now familiar to all of us, for at 1719 GMT on October 15, 1972, the A-O-C satellite became the sixth in the OSCAR series with its successful launch into space from the Western Test Range, Lompoc, California, aboard a NASA Thor-Delta rocket. The countdown and OSCAR's launch into space were heard by many amateurs over the facilities of W1AW, W6AB, W3ZM and several other stations in the United States and Australia. OSCAR 6 is the first of a series of long lifetime amateur satellites, and is designed for a period of operation of a year or more in space. Its 910 mile altitude sun-synchronous orbit makes tracking fairly simple, since the satellite passes repeat at similar times on a two-day cycle.

OSCAR 6 represents several innovations in space. This is the first time that satellite telemetry has been transmitted to the ground directly as Morse code. It is the first time a digital memory system, CODESTORE, has been used for the store-and-forward of Morse code and teletype communications/operations messages. A two-to-ten meter linear repeater designed for multi-channel communications is in operation from space for the first time, and also for the first time a beacon is operating in the new 435-438 MHz portion of the seventy-centimeter band allocated to the Amateur Satellite Service at the 1971 ITU Space Conference. OSCAR also contains a 21-function command system capable of changing the operating conditions of the spacecraft by ground control.

In June, an Amateur Satellite Service Committee was established comprised of representatives of ARRL, Project OSCAR and AMSAT. Chaired by W.W. Eitel, WA7LRU/W6UF, Chairman of the Board of Project OSCAR, the Committee will develop plans for funding and staffing satellite projects, advise on regulatory matters affecting the Amateur Satellite Service, and organize programs for the public service use of amateur satellites.

Also during the past year, the Talcott Mountain Science Center in Avon, Connecticut constructed and delivered three OSCAR amateur terminals under a grant from NASA. These terminals are to be used with OSCAR 6 and follow-on amateur satellites in NASA's Spacemobiles, which visit schools and provide demonstrations pertaining to space.

In 1971, AMSAT submitted a proposal to provide a ten-meter amateur station to fly aboard SKYLAB-A, NASA's manned orbiting laboratory scheduled for launch in 1973. The project, named SKYLARC (for SKYLAB Amateur Radio Communications), was designed to encourage the use of space techniques by

amateurs throughout the world, while providing the opportunity to communicate directly with astronauts during their leisure time. On January 7, 1972, NASA sent AMSAT a letter rejecting the proposal. The letter, in part, read: "It is with real regret that I must inform you that, in spite of the broad appeal of your concept and a generally favorable disposition to encourage AMSAT activities, NASA has concluded that we cannot add it to SKYLAB at this stage of the program; and therefore, we must reject your proposal."

AMSAT has also proposed to NASA an amateur repeater experiment for launch as part of the ATS-G Applications Technology Satellite now planned for launch around 1976. This experiment, SYNCART (Synchronous Amateur Radio Transponder) was proposed as a 146-to-435 MHz 20-watt linear translator to be integrated into the ATS-G spacecraft for flight into synchronous orbit at a stationary position over the equator. While no final action has been received with regard to this proposal, present indications are that difficulties in implementing a suitable antenna feed system on ATS-G may cause NASA to turn down the SYNCART proposal.

Current Activity

With the successful launch of A-O-C/OSCAR 6 on October 15, AMSAT activities are currently concentrated on assuring the most effective and efficient use of the satellite. Control stations have been established on the East and West Coasts of the United States, Eastern and Western Australia, and New Zealand, with an additional station planned in Europe. CODESTORE loading stations are also being set up in various parts of the world.

In conjunction with OSCAR's operation in space, a contract has been awarded to the Talcott Mountain Science Center to prepare a workbook containing curricula based on the use of amateur satellites as tools in the classroom. This workbook is expected to be completed shortly for distribution to schools throughout the world. In addition, several fellowships are being offered to educators outside the United States to spend a school term at the Talcott Mountain Science Center to learn how amateur satellites can be used in classroom instruction. Upon their return home, these persons will use this experience to teach students in their own countries the various aspects of space science using OSCAR 6 and future amateur satellites.

Also in the planning stages are experiments to use amateur terminals aboard small airplanes and boats for communications through OSCAR 6. The successful two-way transmission of slow-scan television pictures has already been documented, and medical data exchange is also planned via OSCAR 6.

In support of the OSCAR 6 mission, AMSAT nets meet on 3855, 14280 and 21280 kHz to provide orbital and other information concerning the satellite. In addition, a telephone "hot-line" (301-654-1166) has been established to provide recorded information on the orbit and operations.

Concurrently with the operation of OSCAR 6, construction of AMSAT-OSCAR-B is continuing. During the past year AMSAT has employed two aerospace technicians who were instrumental in completing OSCAR 6 in time for its October launch. These technicians are now working on the A-O-B project constructing additional Morse code telemetry encoders, CODESTORE units, two-to-ten meter repeaters, and other systems needed for A-O-B. AMSAT is expecting the delivery of the DJ4ZC/DJ5KQ EURO-OSCAR repeater flight unit, which is now completed. This linear repeater has an uplink from 432.125 to 432.175 MHz, a downlink from 145.975 to 145.925 MHz (inverted passband), and an output of 10 to 14 watts PEP.

Future Activity

Looking ahead to this next year, AMSAT will be most heavily involved in maintaining operation of OSCAR 6 in efforts to maximize its usefulness and its operating lifetime. Concurrently, construction of AMSAT-OSCAR-B will continue at a rapid pace, with the hope of its launch soon after the

end of life of OSCAR 6. Because of this high level of activity, AMSAT is in urgent need of volunteers to assist in the development of satellite hardware, and administrative and financial help is also needed if these projects are to be successful.

THE OSCAR 6 AMATEUR SATELLITE IS IN ORBIT!

By Ted Mathewson, W4FJ

OSCAR 6 was launched from the NASA Western Test Range on Sunday, October 15, 1972, piggyback with the NOAA-2 weather satellite. Its big Thor-Delta rocket put it into orbit over the South Pole. It flew across the equator east of Africa, and the spacecraft was ejected over the Mediterranean. OSCAR came to life immediately, and European and African amateurs reported hearing signals through the satellite repeater.

OSCAR is in a circular polar orbit 910 miles high. Thus it is line-of-sight to stations nearly 2,500 miles away. Amateurs 5,000 miles apart should be able to communicate through it. OSCAR circles the earth every 115.0 minutes at an inclination of 101.77 degrees. In that time the earth has turned to the east under it 28.75 degrees in longitude. Therefore, if you have one official prediction, then by simple addition you can figure out all future equator crossing times and the corresponding longitudes. Copy the broadcasts from W1AW any night and get orbital predictions for the next day. The speed of the satellite is in excess of 15,000 mph. Hence the Doppler shift will make the signals slowly drop in frequency on your receiver as much as $\pm 4\frac{1}{2}$ kHz each passage. The power output on ten meters is about a watt maximum to a dipole.

OSCAR's repeater is entered on two meters--145.90 to 146.00 MHz. Signals are relayed out on ten meters--29.45 to 29.55 MHz. You should hear signals throughout this 100 kHz passband, and up to 50 kHz below and above it. All modes can be used through it, but CW and SSB are the most efficient. Technicians are authorized to operate through the satellite by FCC waiver. The satellite is sun-synchronous, i.e., it will appear overhead at approximately the same times each day, around 9 AM and 11 AM each morning, and 9 PM and 11 PM each night,regardless of your location. The morning passes come down from over the North Pole, and the night passes come up from across the equator. A flyover lasts only about 20 minutes, so you must know the times pretty closely. If you have a ten meter beam, lucky for you. Most of us are using just dipoles or long wires. Just 10 watts of two meter power is adequate to work through the satellite, particularly on an overhead pass.

K2RTH of New York was able to hear his own signals through the satellite when it was over Dakar in W. Africa, over 3,000 miles away. Amateurs in over two dozen countries are being heard and worked through OSCAR. OSCAR also carries a beacon on 435.10 MHz. It has 300 mw output and sends 24 three-digit numbers representing telemetry in Morse code at 10 or 20 wpm. This tells us the operating conditions within the satellite.

OSCAR 6 has solar cells and a nickel-cadmium battery and was built for a year or more of useful life. So there is plenty of time for you to get equipped on 145 and 435 MHz.

Keep a log of stations heard and worked, with date and time. Submit your log periodically to AMSAT and you will receive a colorful QSL in return.

CANDIDATES ELECTED TO THE BOARD OF DIRECTORS FOR 1973-1974

William I. Dunkerley, Jr., WA2INB

William Dunkerley, WA2INB is Managing Editor of QST at ARRL Headquarters, Newington, Connecticut. He was chairman for the International VHF Convention held in 1964, and was a founder of the Space Communications Group of the East Coast VHF Society (WA2WEB), where he was Vice President. He is a past

director of the Hudson Division. He is a director of the Talcott Mountain Science Center. He is presently an AMSAT director and has been serving as AMSAT's ARRL coordinator. As such he has handled all AMSAT material appearing in QST and in ARRL bulletins, and he has personally authored numerous articles on OSCAR 5 and OSCAR 6 in QST. He coordinated plans for AMSAT's National Radio Amateur Satellite Conference held in 1970 in Boston, and is now involved in the educational and training programs for OSCAR 6.

William A. Hook, W3QBC

William Hook, W3QBC has been a ham since 1949 and holds an Advanced Class amateur license. Professionally, he is a Research Microbiologist at the National Institutes of Health, Bethesda, Md. His work at NIH has been primarily in the field of immunology and bacteriology. He has been Secretary-Treasurer of the NIH Amateur Radio Club since 1969 and has been active in the Medical Information Network (MEDINET). He has served as AMSAT's liaison with the U.S. Public Health Service in regard to providing communications concerning medical information and emergencies with radio amateurs in isolated areas. He is a past president of the University of Maryland Amateur Radio Association, and is a member of Montgomery County RACES. Since January 1972 he has assumed the duties of the AMSAT Treasurer and has also been responsible for the membership mailing list.

Raphael Soifer, K2QBW/3

Known as Ray to most of us, K2QBW has been a member of AMSAT from almost its inception. He handled the propagation investigation aspect of the Australis-OSCAR 5 satellite project, and unearthed much interesting and useful information. He also served a similar function in connection with the 1971 AMSAT aircraft tests of the two-to-ten meter translator. Ray, who holds an Extra Class amateur license, is an active ham, being a confirmed contest man and member of the Potomac Valley Radio Club in addition to his AMSAT affiliation. K2QBW is also a member of the Northern Va. FM Association, the RSGB, and is a Life Member of ARRL. In his academic years he was active from both W1MX and W1AF at MIT and Harvard where he received his education. Professionally, Ray for the past several years has been a Special Assistant to the Assistant Secretary of Commerce in Washington, D.C., in which position he has been involved in Maritime affairs. He is a licensed stock broker and has had wide experience in investment banking. In addition to his analyses of data from the OSCAR 5 and aircraft experiments, he has been serving as AMSAT's consultant on financial matters.

George V. Kinal, K2MBU/WA3TRL (First Alternate)

George Kinal, K2MBU/WA3TRL is an engineer on the technical staff at Computer Sciences Corporation in Falls Church, Va., where he has been working on communications satellite systems studies. He is one of the founders of AMSAT and has served as AMSAT's Vice President-Engineering since 1969. He was active in the Australis-OSCAR 5 preparation and test program, and helped develop the technical specifications for the AMSAT-OSCAR-B/C satellites. He was involved in the preparation of the SYNCART proposal, and he also assisted in constructing ground support equipment for AMSAT-OSCAR-C.

Sheldon Glick, WA1IUO (Second Alternate)

Shelly Glick, WA1IUO is a Radio-Electronics instructor at the Talcott Mountain Science Center for Student Involvement, Avon, Connecticut, where he teaches Radio and Electronics to students from the various schools associated with the Science Center. He is one of the original members of the Space Communications Group of the East Coast VHF Society, and is a former assistant director of the ARRL Hudson Division. He is also a former director of the Hudson Amateur Radio Council. He has been serving as AMSAT's manager of tracking and orbital prediction, as well as having responsibility for AMSAT's educational activities. During the OSCAR 5 and OSCAR 6 missions he has been responsible for supplying orbital predictions for transmission by W1AW. He is the author of two QST articles on OSCAR 5 and is currently helping develop educational course curricula for the use of OSCAR 6 in schools.

AMSAT-OSCAR-C (OSCAR 6) FACT SHEET

Launch:	October 15, 1972, at 1719 GMT from Western Test Range, Lompoc, California, by NASA with the NOAA-2 meteorological satellite on a two-stage Thor-Delta launch vehicle.
Orbit:	910-mile circular, polar orbit, 101.7° inclination, 114.9946 minute period, sun-synchronous, with passes repeating on a two-day cycle around 9 AM and 9 PM local time.
Weight:	40 pounds.
Size:	6.4" x 12" x 17.3" rectangular solid, 50 per cent covered with n-on-p silicon solar cells.
Repeater:	145.9 to 146.0 MHz input band, 29.45 to 29.55 MHz output band, 1 to 1.3 watts output.
Beacons:	29.45 MHz at 200 milliwatts; 435.10 MHz at 300 milliwatts.
Antennas:	Ten-meter dipole made of standard carpenter's rule. Two-meter and 435 MHz antennas are quarterwave monopoles made from piano wire.
Telemetry:	24 channels, transmitted sequentially in Morse code at 10 or 20 wpm. Battery and regulator voltages, solar array and experiment currents, RF outputs, and temperatures are telemetered approximately every 180 or 90 seconds, depending on code speed.
CODESTORE:	An 896-bit digital shift-register message storage unit capable of storing and playing back 18-word Morse code and 22-word teletype messages loaded by selected ground stations.
Command:	21-function command system capable of turning on and off the repeater, 435 MHz beacon, telemetry and CODESTORE, and selecting high or low speed Morse code telemetry rate.
Power:	n-on-p silicon solar cells and rechargeable 6 amp-hour nickel-cadmium battery (24 V). Approximately two watts of average prime power is available at beginning of life.
Thermal:	Chromium thermal control coating, vapor-deposited on Kapton. Designed for 15° C.
Stabilization:	Passive magnetic attitude stabilization along the longest axis, achieved by an 8" long 50,000 pole-cm Alnico 5 magnet. Spin is dampened by twelve 0.125" Allegheny Ludlum Type 4750 permalloy rods.
Mission:	Instructional programs in schools, using OSCAR 6 as an educational tool to illustrate physical concepts. Multiple-access communications experiments. Communications to remote areas, emergency and other public service communications.

W1AW SPECIAL OSCAR ORBIT BULLETINS

Mon.-Fri.	1900Z	3580,7080, 14080, 21080, 28080 cw
*Sunday	2100Z	(same - cw)
*Sunday	0200Z	3625, 7095, 14095, 21095, 28095 MHz RTTY (wide and narrow shift)

*Full week of orbital data given.

MEETING MINUTES

Minutes of Amateur Satellite Service Committee

Oct. 7, 1972 - Tysons Corner, VA.

Attendees:
Mr. William Eitel, W6UF/WA7LRU, Chairman
Mr. Harry Dannals, W2TUK, A.R.R.L.
Mr. Ray Vincent, WA6CBX, OSCAR
Mr. Perry Klein, K3JTE, AMSAT
Mr. Richard Daniels, WA4DGU, AMSAT
Mr. V.C. Clark, W4KFC, A.R.R.L.
Mr. John Huntoon, W1RU, A.R.R.L.

Mr. Klein, recently returned from Vandenberg Air Force Base, California, described preparations for the upcoming AMSAT/OSCAR C launch. The 435.1 MHz beacon has been included in the package and will be operated at pre-scheduled intervals. Final instrumentation was the joint product of amateurs in Germany, Australia, and several of the United States. The launch is currently scheduled for 1:14 p.m. EDT, Oct. 13, 1972.

Mr. Klein described current AMSAT thinking regarding the approach to the Syncart-76 Project. Prospects for placing an amateur satellite in synchronous orbit as part of the ATS-G project (in 1976) now appear to have diminished somewhat because of integration costs and the fact that the ATS-G project itself may be in trouble as the result of overruns. As a consequence, AMSAT now proposes to proceed with the development and construction of packages which could lend themselves for use with either synchronous or asynchronous satellites. The package intended for use with Syncart will include a 144 to 435 MHz linear repeater.

Mr. Daniels indicated that extensive design reviews required in the final stages of the AO-C preparation, arising from concern expressed by managers of other experiments aboard, dictate caution in pressing for NASA support of new amateur satellite projects. The relaxation of pressure for additional "rides" in the next few months will help assure continuity of long-term good will and cooperation.

Messrs. Klein and Daniels suggested a target date for AO-B launching approximately one year from now, at which time (assuming a successful launch) AO-C should be nearing the end of its useful life. Meanwhile, it was agreed that the possibility of obtaining space on U.S. Air Force vehicles should be actively explored.

A lengthy discussion of proposed educational programs to be sponsored in conjunction with satellite programs ensued. AMSAT has initiated a project to develop classroom workbook curricula for distribution to high schools throughout the country. A $2000 contract has been entered into with the Talcott Mountain Science Center for this work. A further program to subsidize part of the cost of participation by qualified foreign educators in an amateur satellite educational course, in cooperation with the Talcott Mountain Science Center and the University of Hartford has geen approved in principle by AMSAT. Cost of such an undertaking for a total of six students was estimated by AMSAT at $17,000, and would include cost of food, housing and travel while in the United States, and OSCAR ground terminal equipment; tuition to be contributed by Talcott Mountain Science Center. Under the plan, cost of transportation to and from the U.S. would be borne by the student or his national sponsor, as would part of the costs stateside. The concept includes provision of satellite ground terminal equipment which each student could take back to his country.

The following positions were adopted by the committee, with all members concurring:

* The Amateur Satellite Service Committee holds the role of the A.R.R.L. to be primarily in the areas of education, publicity, and international aspects of amateur satellite programs.

* The Amateur Satellite Service Committee has reviewed the AMSAT/ Talcott Mountain Science Center contract for the preparation of high school and junior high school classroom curricula for use with amateur satellite programs, endorses the general approach and recommends that AMSAT and A.R.R.L. discuss and work out details for further prosecution of this educational program.

* The Amateur Satellite Service Committee endorses the concept of the foreign graduate student educational program conceived by AMSAT and recommends that AMSAT and A.R.R.L. discuss and work out details of its execution.

A report of the AMSAT fund-raising program was made by Mr. Klein. Twenty donors responded with approximately $250-$300, in addition to the 1,000 shares of Varian stock donated by Mr. and Mrs. Eitel. Further fund-raising efforts will be deferred until after the launch of AO-C.

Mr. Eitel described the results of recent contacts made by him during his visit to the Washington, D.C. area, and these were discussed at length.

Discussions were held regarding the use of contests as a means of increasing interest in satellite communications. AMSAT feels that organized operating activities such as contests and awards could materially increase interest in satellite communication. A second view was expressed that this might most appropriately be accomplished in connection with VHF contests and possibly Field Day, but that little interest is likely to result from any attempt to include credit for contacts through satellites in high frequency contests, at least at the present stage of development. The desirability of continued coordination of these matters with the Contest Advisory Committee was noted.

A proposal from NASA Houston (Dick Fenner) whereby amateurs would be enabled to speak with Skylab astronauts through NASA uplinks was discussed. This envisions patching of amateur signals received at Houston into NASA communications circuits, rather than direct amateur-to-Skylab contacts, as had originally been proposed by AMSAT. No official position was taken by ASSC, but the view was expressed that this is a poor and inadequate substitute for the original proposal.

A.R.R.L. President Dannals explained that the new A.R.R.L. space committee created by the Board of Directors at its July meeting is a purely internal mechanism intended to facilitate board consideration of space-oriented activities, and does not in any way affect A.R.R.L.'s role or participation in the Amateur Satellite Service Committee.

Mr. Klein inquired as to the nature of and scheduling for the Technical Symposium voted by the A.R.R.L. Board of Directors at its July, 1972 meeting. Messrs. Dannals and Huntoon explained that planning for this has not yet begun but that some consideration is being given to scheduling the affair contiguous to a state or division convention so as to assure greater attendance, and that negotiations with the sponsors of the Roanoke Division Convention is contemplated. This is scheduled for September 14-16, 1973, at Reston, Virginia.

A date for the next ASSC meeting will be established later and all members advised by mail.

Respectfully submitted,

W.W. Eitel, Chairman

AMSAT Board of Directors Meeting

August 10, 1972

The Board of Directors meeting was called to order by President Klein at 8:43 PM at his apartment.

In attendance were: Ray Soifer K2QBW, Bob Clark WB4SMH, Jan King W3GEY,

Shelly Glick WA1IUO, Perry Klein K3JTE, Bill Hook W3QBC, Bill Tynan W3KMV, Bill Dunkerley WA2INB (by landline) and Dick Daniels WA4DGU.

The first order of business was to appoint John Gregory W3ATE to the position of AMSAT Communications Network Manager. John will work with Bill Tynan to organize the ground operations nets necessary to support the A-O-C and subsequent missions.

Continued participation in the Amateur Satellite Service Committee was then discussed. Concern was expressed by several that the statement issued by the interim committee was not specific enough for a decision to approve at this time. After extensive discussion, the following was approved:

1. AMSAT would continue participation in the interim committee pending establishment of a charter clearly defining its role.

2. Perry Klein and Dick Daniels would continue to represent AMSAT on the committee.

3. Bill Tynan, Shelly Glick and Dick Daniels were given the action to draw up a charter to be proposed to the full committee.

Disposition of the Varian stock donated by Mr. and Mrs. William Eitel WA7LRU and WA7LUN was the next subject for discussion. It was agreed to set up an account with a local broker with the intention of selling some or all of the stock in the near future. Ray Soifer will work with Perry Klein to accomplish this.

President Klein proposed that the board authorize hiring a second technician to assist in the fabrication of flight hardware where specialized skills are required. This was approved with the understanding that for the present time activity in this area would be specific piece-work tasks.

Bill Dunkerley pointed out that we have been planning educational programs using the amateur satellite for some time but that little funding had been made available for this effort. He felt that with the A-O-C launch so close at hand, some action should be taken to implement these programs, particularly the plans to train selected individuals from developing countries in classroom techniques. Specifically, he proposed:

1. The board endorse the plan to bring three to six individuals into this program as planning and funds permit.

2. AMSAT should seek reimbursement for all of this expense from other organizations, but be prepared to fund some amount in the event we cannot secure outside funding, provided such funds are available after providing for hardware and technician support.

3. Continue developing curricula for classroom use of amateur satellites including the development of a workbook on setting up a ground terminal in the classroom. Funds were approved to support this activity on essentially the same basis as above. This funding would support preparation of the material but not printing and publication.

The proposals were favorably received and were approved with the condition that the proposals be submitted in written form giving more specific details. It was expected that this could be done within two weeks.

Shelly Glick moved to appropriate up to $30 to provide for a more adequate telephone amplifier for use in future meetings. This was approved.

The meeting was adjourned at 12:15 AM.

Dick Daniels WA4DGU
With assistance from
Ray Soifer K2QBW

23 Oct 72

The meeting was opened at 10:30 am by President Perry Klein K3JTE at his home with the following directors and officials in attendance:

P. Klein	S. Glick	W. Tynan	J. Gregory
J. King	W. Dunkerley	W. Hook	R. Soifer
G. Kinal	C. Dorian	V. Clark	

The first order of businsss was to review a proposal by J. Kasser, G3ZCZ/W3 for AMSAT to launch balloons to carry a transponder for tests and experiments. After discussion it was agreed that AMSAT could support in principle and with limited equipment independent action by Mr. Kasser in this endeavor. It would be necessary for Mr. Kasser to pursue his proposal and take leadership on such a project.

There was a general discussion on the NASA Skylab project.

President Klein presented his letter of 11 Oct 72 proposing the establishment of a paid, full-time, AMSAT President and Executive Director. Considerable discussion and review of this proposal was made during the entire afternoon. This was concerned with the many aspects of salary vs. non-salary, level of pay, expected accomplishment, availability of funds to pay for such a position, effect on volunteer help and membership.

It was agreed that if the work on analyzing and reporting on AO-6 and planning for the next launch were to continue on schedule a large amount of work is required. If it is not possible to hire adequate help to do this, then the only solution is to stretchout the program.

It was agreed that President Klein could undertake a search to determine the availability of funds to pay for his full time employment. However it looked doubtful that such money would be available from known sources--AMSAT, Project Oscar or ARRL. The Directors encouraged President Klein to explore the alternatives and advise at a future meeting.

Discussion was then held on the status of AO-6. It was reported that some stations were still using excessive power in attempting to work thru the transponders. An additional command station is needed in Europe. Bill Dunkerley was requested to write to the DARC in Germany soliciting their help. The RSGB in the U.K. were to be considered as an alternate source of aid. Jan King reported that the 435 MHz beacon was operating well but thatself-generated commands were affecting the satellite.

The status of the contract with the Talcott Mountain Science Center was discussed. It was agreed to request the ARRL to assume this obligation. President Klein and the Secretary were to prepare the letter on this matter.

Details on the forthcoming annual meeting were presented by the President.

The meeting adjourned at 5:30 pm.

AMSAT ANNUAL MEETING, COMSAT LABS

Nov 4, 1972

After an extremely interesting tour of COMSAT LABS and a very well prepared supper, Dr. Perry Klein called the 4th AMSAT annual meeting to order at 2005 hours. Seventy-two members and guests were present. Mr. L. Gray, trustee of COMSAT Amateur Radio Club welcomed AMSAT to COMSAT.

Vic Clark, Liaison Officer of the ARRL Board of Directors, expressed a welcome from ARRL and its officers. He offered congratulations to AMSAT on recent achievements and wished them well.

Nick Marshall explained Project Moonray, the project to put an amateur repeater on the moon. They will not be able to make the next moon landing but hope to have hardware on the moon in 1976.

Perry presented the annual report as reflected elsewhere in this newsletter The treasurer's report was given by Bill Hook, W3QBC as described in this issue. An announcement of the dedication of OSCAR 6 to Captain Harry Helfrich, the deceased past treasurer of AMSAT, was made.

Jan King described the tremendous support and dedication of the NASA Delta vehicle launch office, represented at this meeting by Bob Goss. Jan presented a model of OSCAR 6 to Bob, to be shared with the Delta office staff, for their work.

Perry presented OSCAR pins to Marie Marr, William Scholtz, Dave Reiser, Jan King, and Dick Daniels for their work on OSCAR 6. Ted Mathewson received the first AMSAT OSCAR 6 QSL for sending in the first report on working thru OSCAR 6.

Perry acknowledged the cooperation of the FCC for their help in granting exceptions for working thru the satellite. He went on to stress the need for volunteers to help in all aspects of AMSATs work, particularly if we are to keep up our present level of activity.

Bill Dunkerley of ARRL has expressed thanks to Jan King for his work on OSCAR 6. Bill discussed education and international affairs with respect to amateur satellites.

He also explained the need for and the thoughts of the Amateur Satellite Committee toward education in the space sciences. They believe OSCAR 6 can be used in a secondary education program to demonstrate various aspects of space sciences.

Bill also described a proposal to bring foreign educators to the U.S. and formally train them in the advantages and use of amateur satellites.

Bill then described a program run by Shelly Glick to put on live demonstrations at various educational institutions involving working thru OSCAR 6 and how it can be used for educational purposes.

Bill Tynan discussed operational aspects of OSCAR 6. He described a computer program that converts telemetry data to conventional units and other aspects of data reduction.

John Gregory described the AMSAT communications net and the telephone answering service providing orbital data information. He indicated the tremendous use it is getting. The phone number is (301) 654-1166.

Ted Mathewson gave a report on 435 reception, which he considers excellent and urged others to participate in copying the signals from this beacon. Carl Brown gave an excellent complete explanation of his original method of predicting orbital position of the satellite. The method, which uses equator crossing times as a point of departure, predicts antenna, pointing azimuth and elevation bearings and time of exposure to your station.

Jan King showed and described a series of slides on construction of the satellite. He followed this with a review of satellite operation and present status.

After a short question and answer period, the meeting was adjourned at 2300 hours.

NOTICE OF PROPOSED AMENDMENTS TO THE AMSAT BYLAWS. APPROVED BY THE BOARD OF DIRECTORS

Note: "Changes in the Bylaws of the Corporation shall require approval of two-thirds or more of the Directors. Notice of an amendment which has received such approval shall be circulated to the Members of the Corporation. The amendment shall take effect thirty days after mailing of said notice, unless written objection is received from at least ten per cent of the Membership."

Proposed change to Article IV - "Elected Officers, Committees, Appointed Officials and their Responsibilities"

Section 4

Officers of the Corporation shall be the President, Executive Vice President, Vice President - Engineering, Vice President - Operations, Secretary, and Treasurer. Additional offices may be created or discontinued by the Board of Directors at the discretion of the Board. (Reason for change: To permit the election of additional officers by the board as needed to bring additional officers into the program and to permit spreading the workload to maintain the present high level of activity.)

Proposed changes to Article V - "Meetings"

Section 1

An annual meeting of the Corporation shall be held ~~in November~~ between September and December 31 of each year. The Membership shall be given not less than thirt days written notice of the date and place of the meeting. ~~and shall receive the agenda and a list of nominees for the Board ofDirectors received to date~~. At this meeting the Officers shall present an annual report and the election of Directors shall take place.

Section 2

Written nominations of candidates who have agreed to serve if elected to the Board shall be submitted to the Secretary by an authorized Officer of the Member Society ~~Club at least twenty four hours prior to the~~ by a date specified in advance of the annual meeting.

Section 3

At the annual meeting, votes for directors shall be counted. ~~eleven percent (11%) of the Membership including valid proxies shall constitute a quorum~~. A ~~request for the proxy of each Member~~ mail ballot shall accompany the meeting notice. ~~Any Member may receive and vote proxies~~. Voting shall be conducted by secret mail ballot in a fair and democratic manner, and ballots must be received prior to the close of the annual meeting.

Section 7

The Board of Directors shall meet after the annual meeting but prior to ~~December 15~~ January 1 for the purpose of electing Officers. Additional meetings of the Board of Directors shall be held ~~during the first and third quarters of each year~~. ~~Special meetings shall be held~~ as deemed necessary by the Board. (Reason for Change: To permit more flexible scheduling of the annual meeting with a minimum of conflicts with other amateur activities, and to facilitate participation by members in voting for directors by adopting a mail ballot to replace the former proxy system. This will provide increased opportunity for members to indicate their personal preferences, which will result in a more democratic selection of the candidates for directors.)

AMATEUR RADIO ON A BALLOON

AMSAT is considering expanding its sphere of interest to include a program to investigate the possibilities of launching atmospheric balloons carrying amateur radio experiments in the USA.

The program as proposed would investigate the potential of using emergency repeaters on balloons, utilizing non-space qualified hardware to enable tests of hardware under development for future space-craft experiments.

This program is now in the initial stages and all and any ideas are wanted for discussion. If you have any ideas, experience in balloon work, or just plain want to get involved at the ground stage of the program, write to me in care of AMSAT.

Joe Kasser
G3ZCZ/W3

AMSAT FINANCIAL REPORT

By William Hook W3QBC and
Raphael Soifer, K2QBW/3

Statement of Receipts and Expenses

January 1, 1972 to September 30, 1972

Net Worth January 1, 1972		$ 3,690.12
Receipts:		
Dues	$ 2,588.93	
Donations (Note 1)	17,727.23	
Gains on Sale of Stock (Note 2)	4,337.50	
Interest	61.78	
Refunds	46.38	
Total		$24,761.82
Expenses:		
Travel	1,019.05	
Office Supplies	130.73	
Postage	561.40	
Printing	1,072.78	
Typing	93.00	
Components and Equipment	5,257.54	
Fees and Telephone	240.74	
Educational Curriculum (Note 3)	1,000.00	
Brokerage and Stock Transfer (Note 4)	252.48	
Total		$ 9,627.72
Excess of Receipts over Expenses		$15,134.10
Net Worth September 30, 1972		$18,824.22

Balance Sheet

September 30, 1972

Assets:	
Checking Account	$ 6,206.70
Savings Account	1,967.53
Receivable from Broker (Note 5)	6,262.49
300 Shares Varian Associates Common Stock (Market Value as of September 30: $6,337.50)	4,387.50
Total Assets	$18,824.22
Liabilities:	
None	
Net Worth	$18,824.22

Notes to Financial Statements

Note 1: Donations received by AMSAT were all in the form of cash, except for 1000 shares of Varian Associates common stock donated by Mr. and Mrs. William Eitel on July 6, 1972. This stock is included at its market value on the date of the contribution, which was $14,625.00.

Note 2: Of the original 1000 shares of Varian Associates, AMSAT sold a total of 700 shares prior to September 30, for an aggregate price (before associated expenses) of $14,575.00. The difference between this figure and the value of these 700 shares on the date of their contribution, $10,237.50, is shown as gains on the sale of stock. As of September 30, AMSAT still owned the remaining 300 shares, which shares had a current market value of $6,337.50 and were valued on the date of contribution at $4,387.50.

Note 3: This payment represents one-half of a $2,000 contract with Talcott Mountain Science Center for the development of educational curriculum materials for use with Oscars 6 and 7. The remainder of the $2,000 will be due upon satisfactory completion of the work. In accordance with a decision of the Amateur Satellite Service Committee, AMSAT intends to request ARRL to take over this program, and to reimburse AMSAT for the $1,000 already spent as well as assuming responsibility for the remainder of the contract.

Note 4: The following expenses were incurred in connection with the sales of 700 shares of Varian Associates referred to above:

Brokerage Commissions	$217.18
Transfer Taxes	35.00
Misc. Fees	0.30
Total	$252.48

Note 5: AMSAT sold 300 shares of Varian on September 29, resulting in this receivable from the broker, the payment of which, under the rules of the New York Stock Exchange, was due on October 6. Payment was, in fact, received from the broker in the amount shown, but after the close of these financial statements on September 30.

MEMBERSHIP REPORT

	Nov. 1, 1971	Nov. 1, 1972	Increase
Individual and Family	420	640	220
Societies	41	52	11
Total	461	692	231 (50%)

36 Countries Represented

Angola	England	New Zealand
Argentina	France	Philippines
Australia	Germany	Puerto Rico
Austria	Hungary	Republic of South Africa
Belgium	India	Scotland
Brazil	Iran	Spain
Canada	Italy	Surinam
Ceylon	Japan	Sweden
Chile	Kenya	Switzerland
Colombia	Lebanon	Thailand
Czechoslovakia	Mexico	Uruguay
Denmark	Netherlands	United States

AMSAT Member Societies

Dayton Amateur Radio Association
Dayton, Ohio

COMSAT Amateur Radio Club
Clarksburg, Maryland

Burlington Amateur Radio Club
Essex Junction, Vermont

ARINC Amateur Radio Club
Annapolis, Maryland

Central States VHF Society
Boulder, Colorado

Eagle Rock Radio Club
Idaho Falls, Idaho

Talcott Mtn. UHF Society
Talcott Mtn. Science Center
Avon, Conn.

APL Radio Club
Silver Spring, Maryland

Goddard Amateur Radio Club
Greenbelt, Maryland

USCG Amateur Radio Club
Alexandria, Virginia

Radio Society of Ceylon
Colombo, CEYLON

East Coast VHF Society, Inc.
Patterson, New Jersey

Swedish Ameteur Radio Society
Enskede, SWEDEN

Radio Club Argentino
Buenos Aires, ARGENTINA

NIH Amateur Radio Club
Bethesda, Maryland

Massasoit Amateur Radio Assn., Inc.
Plymouth, Massachusetts

Sun City Amateur Radio Club, Inc.
El Paso, Texas

Wheat Belt Radio Club
Colby, Kansas

Hampden County Radio Assn.
Agawam, Massachusetts

Deutscher Amateur Radio Club
Kiel, GERMANY

Mt. Airy VHF Radio Club
Elkins Park, Pennsylvania

Two Meter Association
Tokyo, JAPAN

Central Mass. Amateur Radio Assn.
Spencer, Massachusetts

Ottawa Amateur Radio Club
Ontario, CANADA

Battelle Columbus Radio Club
Columbus, Ohio

Mesilla Valley Radio Club
Mesilla Park, New Mexico

Tidewater Amateur Radio Club
Norfolk, Virginia

Kekionga Amateur Radio Club
Indiana Institute of Technology
Ft. Wayne, Indiana

Newport County Radio Club
Newport, Rhode Island

The New Zealand Association of
Radio Transmitters, Inc.
Christchurch, NEW ZEALAND

Radio Oscar Club Parma
Parma, ITALY

Liga Mexicana De Radioexperimentadores
A.C.
Mexico D.F., MEXICO

Ambassador College Satellite Stn.
Herts, ENGLAND

Union Schweizerischer Kurzwellen-
Amateure
Seegraben, SWITZERLAND

Radio Society of Great Britain
London, ENGLAND

VE2RM Incorporated
Pincourt Ile Perrot
P.Q. CANADA

Philippine Amateur Radio Assn.
Manila, PHILIPPINES

Rome Radio Club, Inc.
Rome, New York

Montreal Amateur Radio Club, Inc.
Quebec, CANADA

JPL Amateur Radio Club
Pasadena, California

Kokomo Firebird Radio Club
Kokomo, Indiana

Huntsville Amateur Radio Club
Huntsville, Alabama

OK7ULZ VHF Group
Praha, CZECHOSLOVAKIA

IBM Amateur Radio Assn.
Gaithersburg, Maryland

Wireless Institute of Australia
Brisbane, Queensland
AUSTRALIA

Christchurch VHF Group
Christchurch, NEW ZEALAND

Northstar Highbanders Amateur Radio Club
Minneapolis, Minnesota

Space Center Amateur Radio Society
Kennedy Space Center, Florida

Lakehead University Amateur Radio Club
Lakehead University
Thunder Bay, Ontario, CANADA

Chicago Suburban Radio Club
Brookfield, Illinois

Southern Illinois University Amateur
Radio Club
Edwardsville, Illinois

Department of State Amateur Radio Club
Washington, D.C.

Conejo Valley Amateur Radio Club
Thousand Oaks, California

Congratulations on OSCAR 6

Federal Communications Commission
Washington, DC 20554
October 30, 1972

I was pleased to learn of the successful launch on October 15, 1972, of the OSCAR 6 amateur radio communication satellite.

The capabilities of the satellite for repeating signals from amateur radio stations any place on Earth, for telemetering data in Morse Code so it may be copied by any amateur radio operator, for a novel command system, and for a rechargeable solar power source, are testimony to the resourcefulness and ingenuity of amateur radio operators.

Congratulations to you and your fellow amateurs who planned and carried out the launch of OSCAR 6, and best wishes to all amateurs throughout the World in conducting experiments with the satellite.

Sincerely,

Dean Burch
Chairman

The American Radio Relay League, Inc.
Office of the President
26 October 1972

CONGRATULATIONS! On behalf of the officers, directors and members of the American Radio Relay League, please accept congratulations on the successful launch and operation of OSCAR 6.

You, your associates in AMSAT, and the many people who assisted in the OSCAR 6 preparations can be proud of an outstanding achievement, thus marking another chapter in amateur space history.

Best Wishes for your continued success. 73.

W2TUK

CONGRATULATIONS FOR FIRST REALLY WORKING COMOSCAR
KARL
DJ4ZC

17 October 1972

Grateful thanks AMSAT, NASA, ARRL and Australis-OSCAR for a fabulous OSCAR 6! We are all enjoying a tremendous experience, and look forward to many months of exploitation of all AO-C has to offer.

Bruce
ZL1WB

FCC Interpretation on use of Excessive Power Communication Through OSCAR 6

Federal Communications Commission
Washington, DC 20554
November 2, 1972

This is in reply to your inquiry of October 30, 1972.

I am sorry to learn that some stations in the Amateur Radio Service are using excessive power in transmitting to the OSCAR 6 satellite, operating under station license WA3NDS. This is clearly in violation of Section 97.67(b) which limits amateur radio stations to "...the minimum amount of transmitter power necessary to carry out the desired communications."

Additionally, since the design of the satellite is such that received signals from these overpower stations cause interference to all other users of the satellite transponder, these stations are also in violation of Section 97.125 which states, "No licensed radio operator shall willfully or maliciously interfere with or cause interference to any radio communication or signal."

I hope these interpretations will be sufficient to assist the self-policing efforts traditional in the Amateur Radio Service.

Sincerely yours,

James E. Barr
Chief, Safety and Special Radio
Services Bureau

October 25, 1972

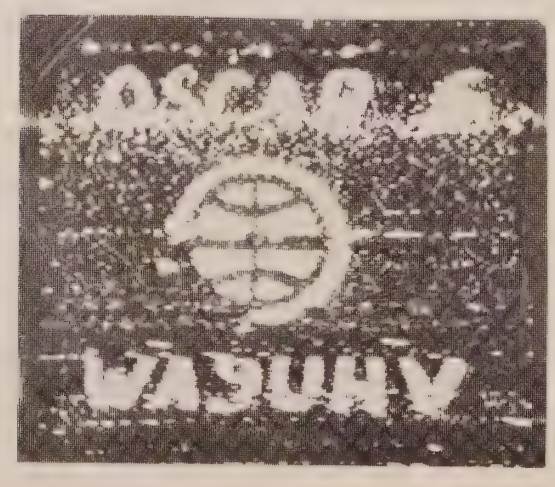
Dear Sirs:

Here are photos that I copied of my own signal and that of WA9UHV's. We claim to have the first two way SSTV QSO through Oscar 6. We have exchanged about 40 partial pictures. The first contacts were made on orbits 30 and 41.

W9NTP gear is as follows:
SB101 Heath transceiver set on the lower end of 10 m.
HA-2 Two meter transverter with about 30 watts out.
Homebrew linear 2 m amplifier with a 4CX250 final (100 w).
10 Element vertically polarized 2 m antenna, rotatable in azimuth only.
NC-303 National Ham band receiver on 10 meters.
10 meter antenna is a 4 element Yagi horizontally polarized rotatable in azimuth.
SSTV gear is a homebrew design sampling camera and a homebrew 7 inch mag. monitor.

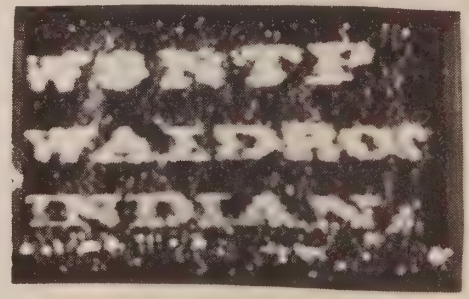
WA9UHV gear is as follows:
SB-100 Heath transceiver.
SB-500 2 meter transverter with 35 watts out.
Two 9 element 2 meter Yagi's spaced on cross members and arranged with phasing to give circular polarization. 2 meter antennas are rotatable in azimuth and elevation.
10 meter antenna is a turnstile built as two inverted V's geometrically at right angles with phasing to give circular polarization. Antenna is 30 ft. high.
Signal One is used as a 10 meter receiver.
SSTV gear is a homebrew W3EFG sampler with mod. and a homebrew W6MXV type monitor.

QSB is so severe that it is very difficult to get even one complete SSTV frame. Main problem is the "power robbing" of other stations. Both of us operate at the high end of the 100 kHz segment. The approx. freq. is 29.530 MHz with injection on 145.980. We stay about 10 kHz apart. Anyone copying the signals should get in touch with W9NTP or WA9UHV.



73's

Don C. Miller
Waldron, Ind. 46182
W9NTP



Proposals for Satellite Programs and Experiments

I believe that two of the most powerful ideas which motivate all Radio Amateurs to select their hobby are embodied in the concepts of "DX" and Contests. They attract more attention and create more desire to participate than any others of the many facets of Amateur Radio. The ARRL and CQ magazine evidently agree; as witness their DX Tests and Contests for certificates etc.

I suggest that AMSAT and ARRL can get a bigger turn-out for participation in OSCAR 6. By announcing ASAP (at once is better) that:

(1) There are many countries which can be QSO'ed NOW via OSCAR 6, with low-powered equipment and that ARRL will give a relatively HUGE multiplier for countries/areas worked via OSCAR 6 in the up-coming ARRL DX Test. There are a lot of DX-er's who would do almost anything, honest, even add a low-powered two meter transmitter and antenna to beat out the other guy in the DX Tests, and lots of them will talk it up plenty over the air if the offer is made. Because of the time element and to lessen the QRM on the OSCAR 6 downlink the OSCAR 6 portion of the DX Tests could be run separately--a few weeks after the regular ARRL DX Tests, with the OSCAR 6 scores incorporated with the scores of the lower frequency bands. This would allow more time for both components of the final score, and particularly to properly publicize the events.

(2) If the time element does not allow incorporation of OSCAR DX with the ARRL Tests, plan and announce a special OSCAR 6 DX Test, for after the ARRL DX tests, with special certificates/prizes and world-wide publicity in QST.

(3) Plan, arrange, and announce, that the next OSCAR (7) (and all future OSCARS) will be very much more favorable to working wide-spread DX...with:

(a) A near-synchronous orbit, like that planned for OSCAR 4, slowly creeping east a few degrees a day...even if you have to procure, or invent, a small engine to be attached to OSCAR 7 itself so that it can be placed in the near-synchronous orbit, even after launch by a lower level rocket, like ITOS-D. I am sure that if this small weight can be propelled thusly to 20,300 statute miles altitude (I do not know the requirements) NASA and AF would be very interested in cooperating, and it would appear to make the choice of a launch vehicle less stringent, less selective. This would mean that OSCAR 7 would have in view nearly 180 degrees at all times, of the Earth's surface. At each place on Earth it would be in view for nearly 10 days at a time. Each station would have the possibility of working all continents. Each station could be scored, for DX Contest purposes, on its own 10 day field of view period, in competition with its own area and with the world.

(b) Regular, or special pre-publicized (well in advance) OSCAR 7 DX tests would be conducted with results published. QST and CQ have contributed immeasurably to the advancement of Amateur Radio by instigating and properly publicizing events such as these.

(c) Persuade ARRL to issue certificates for WAS SATELLITE, WAC SATELLITE, even DXCC SATELLITE, with QST listings etc. These all might possibly be won, if near-synchronous OSCARs are used. All that would be needed then would be the realization, by all hams, that the DX possibilities are great and NOW. Intercontinental QSOs are now being made on OSCAR 6...even at its low altitude and short "time on station".

Bill Hunter K4TI
Ex-W6YK

I propose that AMSAT set up a program to launch balloons carrying amateur radio, for the following purposes:

1. To determine the feasability of Emergency Stratospheric Repeaters for communication in disaster areas.

2. To obtain data about the upper atmosphere, by means of telemetry data.

3. To allow amateurs to set up and practice tracking and working thru airborne transponders in order to develop techniques for use with slow moving high altitude objects prior to the launch of synchronous spacecraft.

4. To develop techniques for AMSAT, so as to handle telemetry data from more than one source at a time.

5. To provide facilities to determine the effectiveness of techniques to be tried on spacecraft.

6. To utilize non space qualified hardware in flight programs.

Two possible flight profiles are ascent/descent flights using balloons set to ascend to a predetermined height and then come down, similar to European ones, and high altitude flights using balloons set to float at a constant height utilizing solar cells and batteries as a power source. The ascent/descent flights might carry a 146.25-85 repeater, and the high altitude flight might carry beacons and linear transponders.

Joe Kasser
G3ZCZ/W3

We feel that the communications aspect by the amateur population enmasse must take a back seat to more important considerations. The complete disregard of the power precautions set forth by AMSAT by some stations is proof to us that a general communications satellite is not in the best interest of amateurs in general. The signals they sent through the satellite were of little use to those of us who wanted to copy some telemetry or track the satellite. Comments were heard on the H.F. net that some stations were running K.W.'s etc. It is no wonder that the weaker telemetry was wiped out. This must cease or the whole space effort will become ashambles. And we will not be willing to assist in any more such efforts unless some stations revise their tactics.

The present satellite can be saved if its use is reassessed. Selected RESPONSIBLE stations in each area of the world should be the only ones allowed to transmit. They should transmit on predetermined frequencies and only there. If possible all the popular modes could be represented but only by the selected stations. They should begin transmission 10-15 minutes before the satellite enters their acquisition area and continue 10-15 minutes after. CW, SSB, and possibly RTTY should be preferred modes. Others of interest would be SSTV, FAX, AM, and FM.

In the future the telemetry should be completely divorced from any repeater system. We realize this would increase the weight and expense but two completely independent telemetry systems, perhaps one simple and one complex, would provide us with more reliable telemetry. The CW telemetry is a good idea, and it is hoped that the RTTY system can be included in the next OSCAR.

In any case the repeater concept should be left until last in the design of future satellites. Completely independent operation with narrow passband seems desirable, because it is better for a few stations to get through than to have bedlam. Perhaps it would be wise to require stations to make reservations for further use and to state the purpose of their need for use.

Jerome Grokowsky
WA9HCZ

The telemetry part will be most interesting to me, probably, and if any RTTY comes through I will try for that. I have in mind feeding it onto tape as received, then boost the speed four times, use the pulses to operate a relay which will key an AFSK for proper demodulator tones. In that way tape speed and doppler effects should be no problem, and would accommodate the OSCAR storage bit system.

F. Douglas Armes
K4RX

In the future I would like to see a synchronous orbit package with at least a 10 meter beacon, better yet a 10 meter repeater.

I really do not understand how to plot OSCAR--I think there should be more information on tracking techniques. I would like to see you put out a simple manual on tracking.

Darryl Dippel
WA5AAO

Do you know anyone in AMSAT who might be interested in experimenting in the 24.000 GHz band reserved for satellite use, or who might be knowledgeable enough about 24 GHz to discuss the feasibility of a synchronous satellite using this band? I'd appreciate any leads.

Paul Fuge
161 Bowershill Road
Oxford, Conn. 06483

The design of a 15-to-10 meter linear repeater will be a possibility, including a minimum risk, because much of it can be copied from OSCAR-6 transponder.

My further proposal is a linear transponder like the construction which was provided for A-O-B: 432 MHz up / 144 MHz down. Output shall be between 3 and 10 W. The beacons may be modulated in A1 with telemetry.

Hartwig Grunewaldt
DC 1 QX

Proposed Experiment (OSCAR 6)

K2QBW, in his article discussing OSCAR V propagation, (QST Oct 69) mentions the observation of unusually long pass durations at 29 MHz which might be due to F layer refraction.

Any station equipped with a good receiver and an antenna which is efficient at low angles can check for pass duration extension and also for the regional nature of pass duration extension.

Listen carefully to satellite passes where the point of closest approach is between 2,500 mi and 3,500 mi. (3,500 mi corresponds to F layer being line of sight to ground station and satellite). Under these conditions it is necessary to only measure $\Delta T = LOS - AOS$. Geometrical considerations will enable one to compute the greatest reception distance. Since a given pass at this distance will only involve a relatively small change in longitude. Each station will be able to solve for 29 MHz distance enhancement $\Delta 29$ (LAT), as a function of a limited range of latitudes. The results of a number of stations will give $\Delta 29$ (LAT) for a large range of LAT and LONG. I expect $\Delta 29$ to be independent of longitude and consistent for latitudes.

Note: Data taking, reduction, and interpretation are simpler and less ambiguous for the experiment described above than for overhead passes or passes within 2,500 mi.

Martin Davidoff
K2UBC

OPERATIONS

By Bill Tynan, W3KMV

From the questions received, one of the biggest problems associated with working with OSCAR-6 seems to be knowing when to listen. Although W1AW regularly carries bulletins containing orbital predictions and AMSAT supplies similar data on a telephone tape machine (301-654-1166), many people still don't seem to get the word. In order toalleviate this situation we are publishing the data below. It provides the first orbit for each day for slightly over five months. Bear in mind that this data is extrapolated using figures for orbital period and equatorial crossing longitude which are derived from averaging over a number of orbits (approximately 500). It is quite likely, therefore, that as time goes by, the figures given will begin to deviate from current data as provided by W1AW and over the AMSAT telephone number. Take notes of any such deviation and make appropriate corrections to the data presented herein. In this way this data can continue to be useful.

In order to use the data to determine orbits other than the single reference orbit given for each day, simply add 115 minutes to each time and 28.75 degrees to each longitude. Since these figures are only approximate, they would, if used over a great length of time, begin to produce significant errors. For this reason the reference orbit for each day should be used in calculating the other orbits for that day. Note that the orbits repeat on a two-day basis. This is because there are about $12\frac{1}{2}$ orbits per day or 25 every two days. Note also that the ascending node times and longitudes for corresponding orbits are not exactly alike. This is because the orbit of OSCAR-6 is not exactly sun synchronous. Examination of the figures reveals that each two days the times are about 5.13 minutes earlier and the longitude moves about 1.29 degrees to the east.

After some experimentation with other schedules, an operating schedule for OSCAR-6 has been worked out calling for the satellite to be off from 0000Z each Monday through 2400Z each Thursday. The satellite is to be on from 0000Z Fridays through 2400 Sundays. It is hoped that this schedule will provide a reasonable compromise between having the satellite on all the time, as all of us would like, and providing sufficient off time to keep the battery fully charged. The schedule will be adjusted one way or another as conditions warrant.

A number of instances have been reported of the satellite being on when the schedule called for it to be off and vice versa. Such instances can be caus by a number of factors including confusion on the part of a command station operator, malfunction of command station equipment, malfunctions within the satellite or possibly a special test of some sort may be in progress. In any case, please do not use the satellite if it is supposed to be off even though you may hear others doing so. If we are to continue to have a satellite operational we must see to it that the battery receives all of the charge possible. Not much, if any, charging takes place when the 2 to 10 M translator is being used heavily.

Operation of the 435.1 MHz beacon will generally be for a few minutes at about 5 minutes after ascending node (south to north equator crossing) on the same orbits as given as reference orbits in the accompanying table. Such operations will generally be for the purpose of gathering telemetry data. Anyone hearing the beacon at these times is requested to copy the telemetry and send reports to AMSAT. Reports can be in one of two forms as AMSAT now has two computer programs operating capable of reducing the telemetry data. Simply the numbers as copied can be accommodated by Bob Carpenter, W3OTC as he uses keyboard entry for his homebrew computer. W3CTF who also has a program running requires his input as five level punched tape. So if you have a reperf unit use that and send the data in that form. Using computers sure beats doing hand calculations for each parameter. Any unusual propagation or other conditions observed on the 435.1 MHz beacon or on the 10 meter output should be reported. Naturally it would be nice to have the 435.1 MHz beacon on more than this but it requires considerable power as does the 2 to 10 M translator and the same restraints must be imposed as regards battery condition.

One more word might be in order. Remember that high power is not required to get into the satellite. 100 watts effective radiated power (transmitter output power, minus feedline loss, times antenna gain) is all that is needed. What most satellite users seem to require, more than a powerful two meter signal, is better 10 meter receiving performance. Apparently a preamp would greatly improve many receivers. Mine sure needs one.

Period = 114.9946 minutes per orbit
Longitude increment = 28.7484 degrees per orbit

Orbit	Date	Time(GMT)	Longitude of Equator Crossing ^{o}W
818	Dec 20, 1972	0015	51.4
831	Dec 21	0110	65.2
843	Dec 22	0010	50.2
856	Dec 23	0105	63.9
868	Dec 24	0005	48.9
881	Dec 25	0100	62.6
894	Dec 26	0155	76.3
906	Dec 27	0055	61.3
919	Dec 28	0149	75.0
931	Dec 29	0049	60.0
944	Dec 30	0144	73.7
956	Dec 31	0044	58.7
969	Jan 1, 1973	0139	72.4
981	Jan 2	0039	57.4
994	Jan 3	0134	71.1
1006	Jan 4	0034	56.1
1019	Jan 5	0129	69.9
1031	Jan 6	0029	54.8
1044	Jan 7	0124	68.6
1056	Jan 8	0024	53.5
1069	Jan 9	0119	67.3
1081	Jan 10	0018	52.2
1094	Jan 11	0113	66.0
1106	Jan 12	0013	51.0
1119	Jan 13	0108	64.7
1131	Jan 14	0008	49.7
1144	Jan 15	0103	63.4
1156	Jan 16	0003	48.4
1169	Jan 17	0058	62.1
1182	Jan 18	0153	75.8
1194	Jan 19	0053	60.8
1207	Jan 20	0148	74.5
1219	Jan 21	0048	59.5
1232	Jan 22	0143	73.2
1244	Jan 23	0043	58.2
1257	Jan 24	0137	71.9
1269	Jan 25	0037	56.9
1282	Jan 26	0132	70.7
1294	Jan 27	0032	55.6
1307	Jan 28	0127	69.4
1319	Jan 29	0027	54.3
1332	Jan 30	0122	68.1
1344	Jan 31	0022	53.0
1357	Feb 1	0117	66.8
1369	Feb 2	0017	51.8
1382	Feb 3	0112	65.5
1394	Feb 4	0012	50.5
1407	Feb 5	0107	64.2
1419	Feb 6	0006	49.2
1432	Feb 7	0101	62.9
1444	Feb 8	0001	47.9
1457	Feb 9	0056	61.6
1470	Feb 10	0151	75.3
1482	Feb 11	0051	60.3
1495	Feb 12	0146	74.0
1507	Feb 13	0046	59.0
1520	Feb 14	0141	72.7

Orbit	Date	Time (GMT)	Longitude of Equator Crossing °W
1532	Feb 15	0041	57.7
1545	Feb 16	0136	71.5
1557	Feb 17	0036	56.4
1570	Feb 18	0131	70.2
1582	Feb 19	0031	55.1
1595	Feb 20	0125	68.9
1607	Feb 21	0025	53.8
1620	Feb 22	0120	67.6
1632	Feb 23	0020	52.6
1645	Feb 24	0115	66.3
1657	Feb 25	0015	51.3
1670	Feb 26	0110	65.0
1682	Feb 27	0010	50.0
1695	Feb 28	0105	63.7
1707	Mar 1	0005	48.7
1720	Mar 2	0100	62.4
1733	Mar 3	0155	76.1
1745	Mar 4	0055	61.1
1758	Mar 5	0149	74.8
1770	Mar 6	0049	59.8
1783	Mar 7	0144	73.5
1795	Mar 8	0044	58.5
1808	Mar 9	0139	72.2
1820	Mar 10	0039	57.2
1833	Mar 11	0134	71.0
1845	Mar 12	0034	55.9
1858	Mar 13	0129	70.0
1870	Mar 14	0029	54.6
1883	Mar 15	0124	68.4
1895	Mar 16	0024	53.3
1908	Mar 17	0119	67.1
1920	Mar 18	0019	52.1
1933	Mar 19	0113	65.8
1945	Mar 20	0013	50.8
1958	Mar 21	0108	64.5
1970	Mar 22	0008	49.5
1983	Mar 23	0103	63.2
1995	Mar 24	0003	48.2
2008	Mar 25	0058	61.9
2021	Mar 26	0153	75.6
2033	Mar 27	0053	60.6
2046	Mar 28	0148	74.3
2058	Mar 29	0048	59.3
2071	Mar 30	0143	73.1
2083	Mar 31	0043	58.0
2096	Apr 1	0137	71.8
2108	Apr 2	0037	56.7
2121	Apr 3	0132	70.5
2133	Apr 4	0032	55.4
2146	Apr 5	0127	69.2
2158	Apr 6	0027	54.2
2171	Apr 7	0122	67.9
2183	Apr 8	0022	52.9
2196	Apr 9	0117	66.6
2208	Apr 10	0017	51.6
2221	Apr 11	0112	65.3
2233	Apr 12	0012	50.3
2246	Apr 13	0107	64.0
2258	Apr 14	0007	49.0
2271	Apr 15	0101	62.7
2283	Apr 16	0001	47.7
2296	Apr 17	0056	61.4
2309	Apr 18	0151	75.1
2321	Apr 19	0051	60.1
2334	Apr 20	0146	73.9
2346	Apr 21	0046	58.8
2359	Apr 22	0141	72.6
2371	Apr 23	0041	57.5
2384	Apr 24	0136	71.3

Orbit	Date	Time (GMT)	Longitude of Equator Crossing ^{o}W
2396	Apr 25	0036	56.2
2409	Apr 26	0131	70.0
2421	Apr 27	0031	55.0
2434	Apr 28	0125	68.7
2446	Apr 29	0025	53.7
2459	Apr 30	0120	67.4
2471	May 1	0020	52.4
2484	May 2	0115	66.1
2496	May 3	0015	51.1
2509	May 4	0110	64.8
2521	May 5	0010	49.8
2534	May 6	0105	63.5
2546	May 7	0005	48.5
2559	May 8	0100	62.2
2572	May 9	0155	75.9
2584	May 10	0055	60.9
2597	May 11	0150	74.7
2609	May 12	0049	59.6
2622	May 13	0144	73.4
2634	May 14	0044	58.3
2647	May 15	0139	72.1
2659	May 16	0039	57.0
2672	May 17	0134	70.8
2684	May 18	0034	55.8
2697	May 19	0129	69.5
2709	May 20	0029	54.5
2722	May 21	0124	68.2
2734	May 22	0024	53.2
2747	May 23	0119	66.9
2759	May 24	0019	51.9
2772	May 25	0113	65.6
2784	May 26	0013	50.6
2797	May 27	0108	64.3
2809	May 28	0008	49.3
2822	May 29	0103	63.0
2834	May 30	0003	48.0
2847	May 31	0058	61.7

The table given below is for use in determining OSCAR's position at different latitudes. To use the table, look up the latitude of interest in the table and add the number of minutes and degrees to the equatorial crossing time and longitude given by W1AW to determine the time the satellite will reach that latitude, and the longitude at that point.

REDUCTION TO OTHER LATITUDES AND HEIGHTS FOR OSCAR-6

Lat N	Min Plus	Long Corr(add)	Sat Ht KM	Lat S	Min Plus	Long Corr (add)	Sat Ht (Kilom)
SN 0	.00	.00	1457.5	NS 0	57.38	194.33	1453.41
SN 10	3.23	2.89	1456.4	NS 10	60.62	197.22	1455.61
SN 20	6.48	5.93	1456.4	NS 20	63.87	200.26	1458.81
SN 30	9.74	9.28	1457.2	NS 30	67.13	203.61	1462.91
SN 40	13.03	13.23	1458.7	NS 40	70.42	207.55	1467.41
SN 50	16.36	18.33	1460.51	NS 50	73.76	212.64	1472.11
SN 60	19.78	25.89	1462.31	NS 60	77.19	220.18	1476.41
SN 70	23.45	40.38	1463.71	NS 70	80.88	234.61	1480.01
SN 75	25.65	56.73	1464.21	NS 75	83.09	250.86	1481.41
N PT	28.70	96.98	1464.21	S PT	86.15	290.97	1482.41
NS 75	31.74	137.38	1463.51	SN 75	89.21	331.52	1482.11
NS 70	33.94	153.83	1462.51	SN 70	91.42	348.06	1481.21
NS 60	37.61	168.39	1460.41	SN 60	95.11	2.70	1478.41
NS 50	41.03	175.97	1458.01	SN 50	98.54	10.31	1474.81
NS 40	44.36	181.08	1455.61	SN 40	101.88	15.44	1470.71
NS 30	47.64	185.04	1453.71	SN 30	105.18	19.40	1466.51
NS 20	50.90	188.39	1452.51	SN 20	108.44	22.76	1462.81
NS 10	54.14	191.43	1452.41	SN 10	111.70	25.80	1459.7
NS 0	57.38	194.33	1453.41	SN 0	114.99	28.74	1457.5

THOUGHTS ON PROPAGATION

In reviewing a number of reports which have come in since the launch of Oscar 6, further information is desired concerning several specific areas. In this connection, your cooperation is particularly requested.

First, concerning the 435.1 MHz. beacon, several amateurs have reported an interesting effect wherein the received signal "breaks up" into several Doppler components, particularly when the satellite is near the horizon. This would seem to suggest a form of multipath propagation, and is interesting from two separate viewpoints -- as a possible limiting factor on the communication range of future UHF amateur satellites, and also as a source of data for ionospheric researchers interested in ray-tracing experiments. We would appreciate, therefore, that those amateurs suitably equipped with frequency-stable receiving systems attempt to tape-record this effect in a form suitable for spectrum analysis, and forward copies of such tapes to AMSAT. Preferably, such tapes should be accompanied by a plot of what the Doppler effect "should have been", derived from orbital calculations, which will serve as a reference with which to compare the received and recorded signals.

Second, concerning the range of the 2-to-10 meter repeater, several amateurs have noted a delay in acquisition after it crosses the horizon, and sometimes an early LOS before crossing the downward horizon. More frequently than not, we believe this is due to erratic behavior in the satellite's experiment control logic, making it necessary to turn it on by ground command and sometimes, to turn it on again after it turns itself off, rather than to propagation effects. In any event, this erratic behavior tends to make most propagation studies basing themselves on times of AOS and LOS somewhat unreliable. In order to have a better idea of the satellite's real range capabilities, AMSAT requests all users participating in long-range QSOs (those in which the great circle distance along the earth's surface between the two amateur stations, without regard to the presumed satellite position, exceeds 4900 statute miles or 7900 kilometers) to report these QSOs to AMSAT. Please use a separate log form from your normal report, and indicate the locations of each station involved as well as the great circle distance between them, the time in GMT, and other pertinent details. Amateurs reporting super-DX QSOs will be suitably acknowledged.

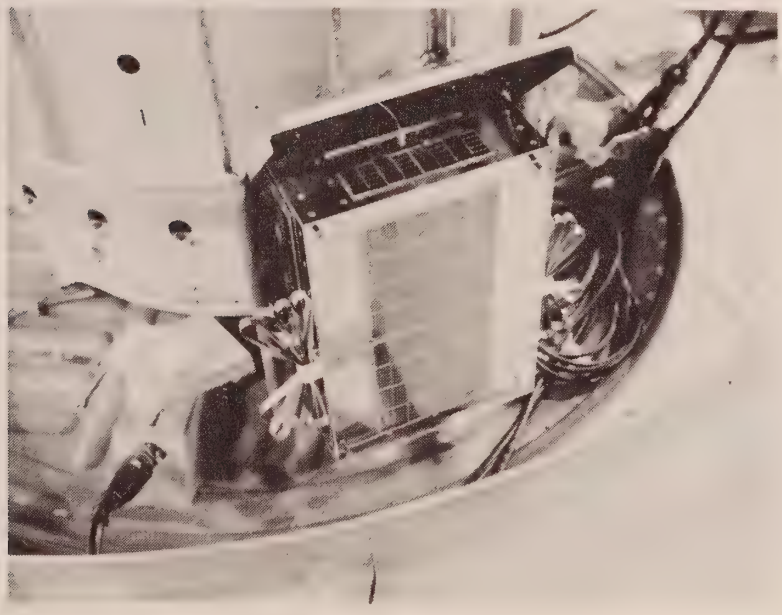
Third, we would like to redirect your attention to the "Comment" column in the log form, and urge that you use it to indicate any unusual signal characteristics such as flutter, aurora, scintillation, multipath, etc., which you might observe on the 2-to-10 repeater. At some future date, we will be correlating all of the received logs with ionospheric conditions, to see if disturbed days yield any significant increase in flutter effects, for example, or any significant decrease in QSO activity.

Fourth, and finally, I note with pleasure that a number of amateurs have built my low-turnstile receiving antenna design for 10 meters, previously published in the Newsletter. Several have commented on its poor performance at low elevation angles. Fellows, that's what it's supposed to do! The low turnstile was intended as an omnidirectional antenna for use at elevation angles above forty degrees, where conventional beam and vertical antennas exhibit nulls in their vertical patterns. As a bonus, it exhibits circular polarization in the vertical (i.e., overhead) direction. It is not a DX antenna, but properly used, should enable you to make more QSOs at shorter ranges by improving your 10-meter receiving capability at higher elevation angles.

Ray Soifer
K2QBW

OSCAR 6 LAUNCH
October 15
at 1719 GMT

Jan King (L) and Perry Klein (R)
Running tests on AMSAT - OSCAR - 6



OSCAR 6 Installed in
the Second Stage of the
Thor Delta Launch Vehicle

OSCAR ORBITAL PATH

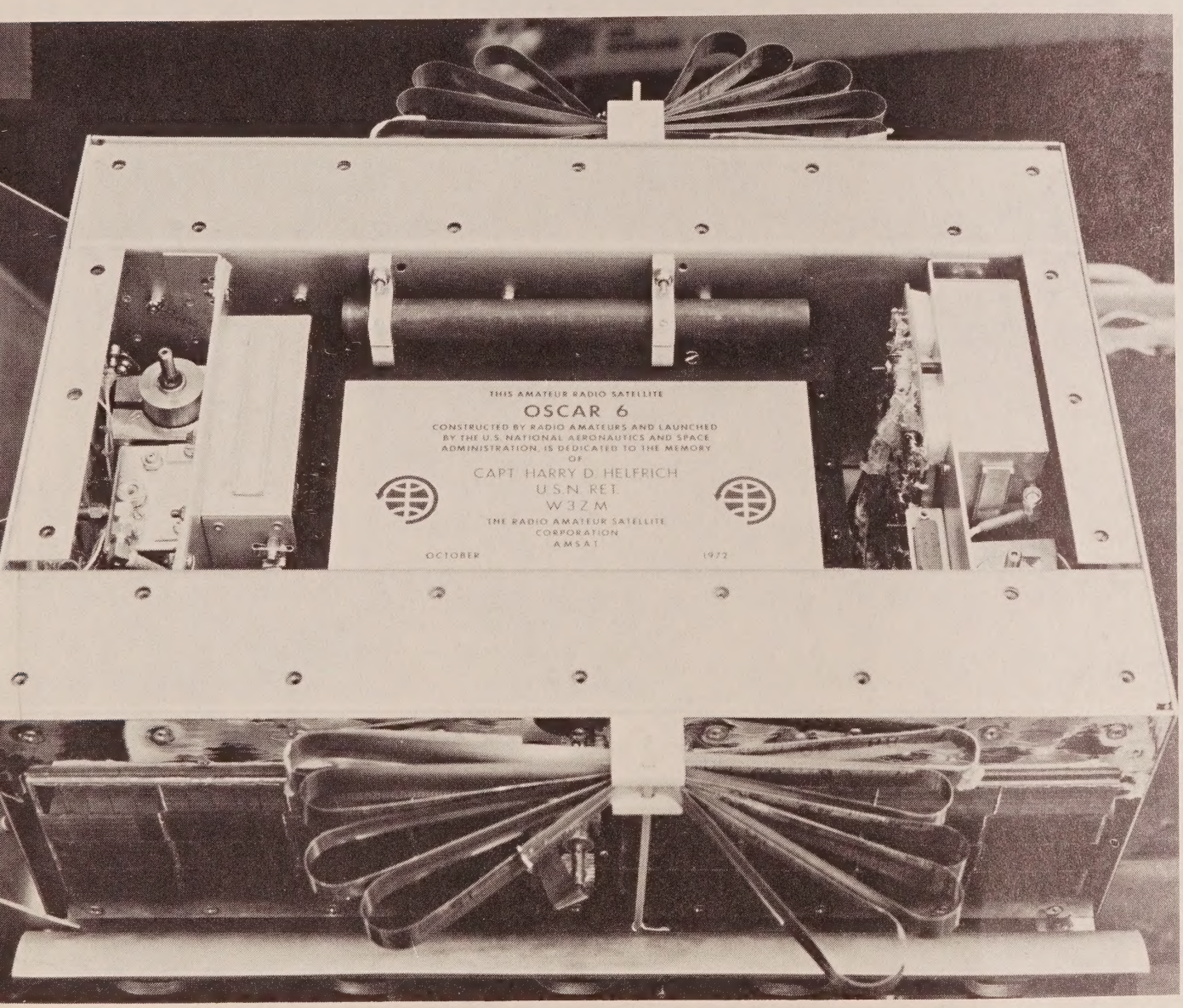
Time Minutes Past Ascending Node (S-N Equator Crossing)	Lat. Degree		Long. Degrees W
0	0	N	0
2	6.1	"	1.8
4	12.3	"	3.6
6	18.4	"	5.5
8	24.5	"	7.44
10	30.6	"	9.6
12	36.6	"	11.9
14	42.7	"	14.5
16	48.7	"	17.7
18	54.6	"	21.5
20	60.4	"	26.5
22	65.9	"	33.3
24	71.1	"	43.5
26	75.5	"	59.9
28	78.0	"	85.6
30	77.6	"	116.
32	74.5	"	139.3
34	69.9	"	153.8
36	64.6	"	163.
38	59.0	"	169.3
40	53.1	"	173.9
42	47.2	"	177.5
44	41.2	"	180.5
46	35.2	"	183.1
48	29.1	"	185.4
50	23.	"	187.4
52	16.9	"	189.4
54	10.8	"	191.2
56	4.6	"	193.
57½	0	S	194.4
59	4.6	"	195.8
61	10.8	"	197.6
63	16.9	"	199.4
65	23.	"	201.4
67	29.1	"	203.4
69	35.2	"	205.7
71	41.2	"	208.3
73	47.2	"	211.3
75	53.1	"	214.9
77	59.	"	219.5
79	64.6	"	225.8
81	69.9	"	235.
83	74.5	"	249.5
85	77.6	"	272.8
87	78.	"	303.2
89	75.5	"	328.9
91	71.1	"	345.3
93	65.9	"	355.5
95	60.4	"	362.3
97	54.6	"	367.3
99	48.7	"	371.1
101	42.7	"	374.3
103	36.6	"	376.9
105	30.6	"	379.2
107	24.5	"	381.4
109	18.4	"	383.3
111	-12.3	"	385.2
113	-6.1	"	387.
115	0	"	388.8

REVISED OSCAR DATA NOW TELEMETERED BY THE MORSE CODE TELEMETRY SYSTEM

Chan.	Parameter	Unit	Parameter Range	Final Calibration Data/Comments N = Value telemetered (omit first digit which identifies the data line number)	Transmitted Format (Read left to right)
* 1A	Total Array current	I (ma)	0 to 500 ma.	N= 80 calibration	1A 1B 1C 1D
* 1B	+X Solar Panel curr.	I (ma)	0 to 100 ma.	$I_{+X} = -1.078\ N + 105.8$ (ma.)	2A 2B 2C 2D
* 1C	-X Solar Panel curr.	I (ma)	0 to 100 ma.	$I_{-X} = -1.102\ N + 107.2$ (ma.)	3A 3B 3C 3D
* 1D	+Y Solar Panel curr.	I (ma)	0 to 200 ma.	$I_{+Y} = -2.240\ N + 219.0$ (ma.)	4A 4B 4C 4D
* 2A	-Y Solar Panel curr.	I (ma)	0 to 194 ma.	$I_{-Y} = -2.105\ N + 205.5$ (ma.)	5A 5B 5C 5D
* 2B	+Z Solar Panel curr.	I (ma)	0 to 370 ma.	$I_{+Z} = -4.300\ N + 417.0$ (ma.)	6A 6B 6C 6D
* 2C	-Z Solar Panel curr.	I (ma)	0 to 370 ma.	$I_{-Z} = -4.100\ N + 402.5$ (ma.)	
2D	Bat. Charge or Discharge current	I (ma)	-500 to +500 ma.	$I_{BAT} = 10.00\ N - 500$ (ma.)	
3A	Unregulated Bus vtge.	V	12.4 to 30V	$V_{BUS} = 0.174\ N + 12.4$ (volts)	
3B	$\frac{1}{2}$ Battery voltage	V	0 to 15V	$V_{\frac{1}{2}BAT} = 0.161\ N$ (volts)	
3C	Switching Reg. vtge.	V	0 to 15V	$V_{SR} = 0.147\ N$ (volts)	
3D	Battery Temp.	^oC	-30 to +50^oC	$T_{BAT} = -1.471\ N + 95.79$ (^oC)	
4A	Baseplate Temp.	^oC	-30 to +50^oC	$T_{BP} = -1.471\ N + 95.79$ (^oC)	
4B	Translator P.A. Temp.	^oC	-30 to +50^oC	$T_{PA} = -1.471\ N + 95.79$ (^oC)	
4C	+X Panel Temp.	^oC	-30 to +50^oC	$T_{+X} = -1.471\ N + 95.79$ (^oC)	
4D	+Y Panel Temp.	^oC	-30 to +50^oC	$T_{+Y} = -1.471\ N + 95.79$ (^oC)	
5A	+Z Panel Temp.	^oC	-30 to +50^oC	$T_{+Z} = -1.471\ N + 95.79$ (^oC)	
5B	Translator P.A. Emitter current	I (ma)	0 to 500 ma	$I_{PA} = 5.00\ N$ (ma)	
5C	Transl. Sw. Reg. vtge.	V	0 to 30V	$V_{T.S.R.} = 0.30\ N$ (volts)	
5D	Instr. Sw. Reg. curr.	I (ma)	3.8 to 63.8 ma	$I_{I.S.R.} = 0.601\ N + 3.80$ (ma)	
6A	Translator R.F. Power	mW	0 to 10W	$P_{OUT} = 1.0\ (N)^2$ (mW)	
6B	Beacon R.F. Power (435.1 MHz)	mW	0 to 1W	$P_{OUT} = 0.10\ (N)^2$ (mW)	
6C	Translator AGC vtge.	V	0 to 3V	$V_{AGC} = 0.03\ N$ (volts)	
6D	Midrange Cal.	V	0 to 1V	N = 50 counts ± 1	

* These equations represent changes in the previously published values.

If you have received this newsletter as a sample, and if you are not already a member of AMSAT, you are cordially invited to consider membership in support of OSCAR 6 and future satellite projects. Members receive this AMSAT newsletter quarterly; it contains the latest news of the amateur satellite program. Members are encouraged to suggest, help plan and participate in satellite projects. A handy application for AMSAT membership, on the reverse of this page, may be cut out and mailed to AMSAT with $5.00 membership dues. Contributions are also vitally needed to help with the early completion of AMSAT-OSCAR-B/OSCAR 7, which promises to be a considerable step forward beyond OSCAR 6.



Photograph of the Plaque Aboard OSCAR 6, Dedicating the Satellite to the Memory of Harry Helfrich, W3ZM, AMSAT's Late Treasurer, Who Joined the Silent Keys January 6, 1972.

AMSAT

RADIO AMATEUR SATELLITE CORPORATION
P. O. Box 27, Washington, D.C. 20044 USA

MEMBERSHIP APPLICATION

Name _____ Call _____ Class of License _____ Home Ph. _____

Street _____ City _____ State _____ Zip _____

Employer _____ Position _____ Bus. Ph. _____

Bus. Address _____

ARRL Member? ☐ Yes ☐ No. Club Affiliations _____

What Bands and Modes are you active on? _____

Education _____

Are you willing to accept an assignment within your field of interest? ☐ Yes ☐ No.

Please indicate how you can help AMSAT. _____

_____

_____

MEMBERSHIP QUESTIONNAIRE (OPTIONAL)

PLEASE INDICATE BELOW AREAS OF POSSIBLE CONTRIBUTION (Check those which apply.)

Engineering

- ☐ Prel. Design
- ☐ Antennas
- ☐ Tracking
- ☐ Power Systems
- ☐ Telemetry
- ☐ Structural Design
- ☐ Fabrication
- ☐ Drafting
- ☐ Other _____
- ☐ Circuit Design
- ☐ Data Proc.
- ☐ Stabilization
- ☐ Testing
- ☐ Packaging
- ☐ Data Acquisition
- ☐ Data Dissemination

Administration

- ☐ Ext. Relations
- ☐ Library
- ☐ Fund Raising
- ☐ Data Processing
- ☐ Legal
- ☐ Editorial
- ☐ Liaison with ____ _____
- ☐ Other _____ _____
- ☐ Tech. Writing
- ☐ Clerical/Sec.
- ☐ Printing/Repro.
- ☐ Photography
- ☐ Accounting
- ☐ Publications
- ☐ Tech. Translation (indicate languages) _____
- ☐ Education

Please describe experiments you believe AMSAT should undertake. _____

_____

_____

I understand that the statements made hereon are for the exclusive use of the Radio Amateur Satellite Corporation and will not be released to other agencies. I further understand that it is my responsibility to insure that only information which my employer does not consider proprietary will be released to AMSAT.

I hereby apply for membership in AMSAT. Attached is $5.00 to cover the first year's dues. (Donations above this amount are tax deductible.) (Dues may be prepaid for any number of years.)

Signed _____ Date _____

Form 1 (rev. 3/71) N/L 12/72

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Pd _____ Cd _____ Cdd ☐ Dpl ☐

FOR OFFICE USE ONLY
NAME _____ CALL _____ LIC. A B ARRL / C D Act. E F Eng. G H Exp. _____